Journal of Natural Sciences Research
ISSN 2224-3186 (Paper) ISSN 2225-0921 (Online)
Vol.5, No.4, 2015
www.iiste.org

# Effect of Increasing age and weight on Blood pressure and Body mass index

Kayode Adebayo (Corresponding author)
Chemical Pathology department, Faculty of Clinical Sciences, College of Medical Sciences, Ambrose Alli University, Ekpoma. Edo State. Nigeria.
Tel: +23480 -230 -71025 E-mail: kjadebayo@yahoo.com

Adanma Adebayo-Kay
Walt Disney Magnet School, Chicago. IL, USA.
Tel: 1 773 441 8919 E-mail: adebayoviv@yahoo.co.uk

**Abstract**

It has been observed that different people have different blood pressure. People with larger frame and weight tend to have higher blood pressure than their contemporaries with smaller frame and lesser weight. This work was done to document variations in blood pressure and body mass index across ages and sex and to find out if increasing weight and age do lead to increased blood pressure. Volunteers were randomized and contacted at homes, clinics and places of worship. Volunteers were aged 1-50years and of both genders. They had their height, weight and blood pressure taken. The result show that blood pressure and body mass index increased with increasing age in both genders. Considering the harmful effects of high blood pressure, the controllable factor, weight should be monitored and controlled to avoid the harmful effects of high blood pressure.
**Keywords:** Blood pressure, age, gender, weight, body mass index.

## 1. Introduction.

It is generally believed that body mass index (BMI) and blood pressure increases with age (Roy *et al* 2012). Other well studied parameters are the BMI and blood pressure in both genders. Many authors have it that both parameters are higher in males than females. Many reasons have been advanced in an attempt to justify the difference. These include the relatively higher adiposity observed in the females and the higher bone densities in males. Hormonal changes at puberty have also been postulated as a reasonable explanation. Childhood obesity has been known to correlate well with adult hypertension in both genders and all socioeconomic status (Woelk 1994). It is worth noting however that most of these findings are largely inconsistent and thus inconclusive. We therefore set out to see the pattern of BMI and blood pressure from the preschool age to adulthood in a given neighborhood.

## 2. Materials and Methods

This is a cross-sectional study that started following a similar work as a class project at the Walt Disney Magnet School, Marine Drive, Chicago, IL, USA in 2013. Subjects were randomly selected from the Rogers Park neighborhood. They ranged between age 2 and 47 years. Oral and written informed consent was obtained from the participants and /or their guardians before enrolment. Anthropometric and other necessary data were also taken but de-identified. Measurements were taken at a local health center, a place of religious worship and in some houses.

### Measurements

Anthropometric measurements were taken following an adaptation of the recommendations in the anthropometric standardization reference manual. Weight was measured in pounds (lbs) using a standing scale and recorded to 0.1lbs. Height was measured in Centimeters (cm) using a standing meter rule and recorded to 0.1cm. The age was as at last birthday or completed years.

Measurements were taken in duplicates fifteen minutes apart and averaged. The BMI was read off the Center for Disease Control BMI chart (CDC). This has standardized BMI for specific heights and weights and the BMIs are color coded into undernourished, good, overweight and obese. Systolic blood pressure (SBP) and Diastolic blood pressure (DBP) in mmHg were measured using age appropriate cuffs for pediatrics and adults.

### Statistical analyses

All analyses were performed using the Microsoft office EXCEL 2007 software. Significance was taken at p of 0.05.

## 3. Result

Subjects were 50(25males, 25females). Their average age was 24.7 ± 1.8 years. The mean weight, DBP, SBP and BMI for each decade is as shown in Table 1 below. Results were presented as mean ±SD. Microsoft Excel software and Pearson's correlation coefficient® were used to show the means and correlation between parameters respectively. $P \leq 0.05$ was considered statistically significant.

## 4. Discussion

The results show that DBP, SBP and weight increase as the age increases (Table1 and Fig 3). The relationship between weight and SBP is shown in Fig1. This shows that SBP increases as the weight increases. Height is less variable after adulthood and its use is in the calculation of BMI. Weight is the main factor that can be targeted so that obesity can be reduced (Dietz 1994). Although BMI is a measure of relative weight rather than adiposity, it is being used to determine overweight and obesity among children and adolescents (Roy *et al* 2012). Obesity/overweight has been declared an epidemic and a public health crisis among children worldwide (Guo and Maynard 2000). This is due to its increasing prevalence. Overweight in children is defined as a BMI of $\geq 95^{th}$ percentile for age and gender. The number of children 2 – 15 years of age with BMI in excess of $95^{th}$ percentile for age and gender specific has increased in the last three decades. Increased BMI, overweight or obesity will make such children susceptible to weight related health concerns (Xiaoli and Youfa (2008) . These include pulmonary, orthopedic, gastroenterologic, neurologic, endocrine and cardiovascular risk factors.

## 5. Conclusion:

Increasing weight leads to increased BP. Increasing age is associated with increased BP and an increasing BMI is associated with increased BP. Therefore reducing weight will be beneficial for the individual. People should regularly measure their weight and blood pressure to stay healthy. Children should be fed in a healthy way and encouraged to exercise.

## References

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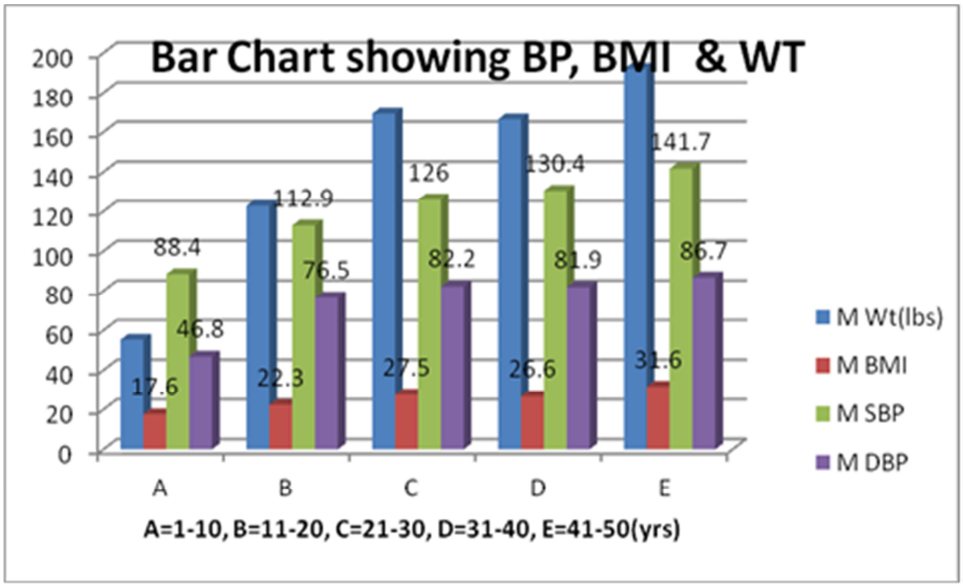
**Table 1**: Mean Weight [Lbs], Body mass index [BMI], Systolic Blood Pressure [SBP] mmHg and Diastolic Blood Pressure [DBP] for each age group.

| Age [Yrs] | Mean Wt(lbs) | Mean BMI | Mean SBP | Mean DBP |
|---|---|---|---|---|
| 1-10 | 55.3 | 17.6 | 88.4 | 46.8 |
| 11-20 | 122.8 | 22.3 | 112.9 | 76.5 |
| 21-30 | 169.2 | 27.5 | 126 | 82.2 |
| 31-40 | 166.4 | 26.6 | 130.4 | 81.9 |
| 41-50 | 192 | 31.6 | 141.7 | 86.7 |

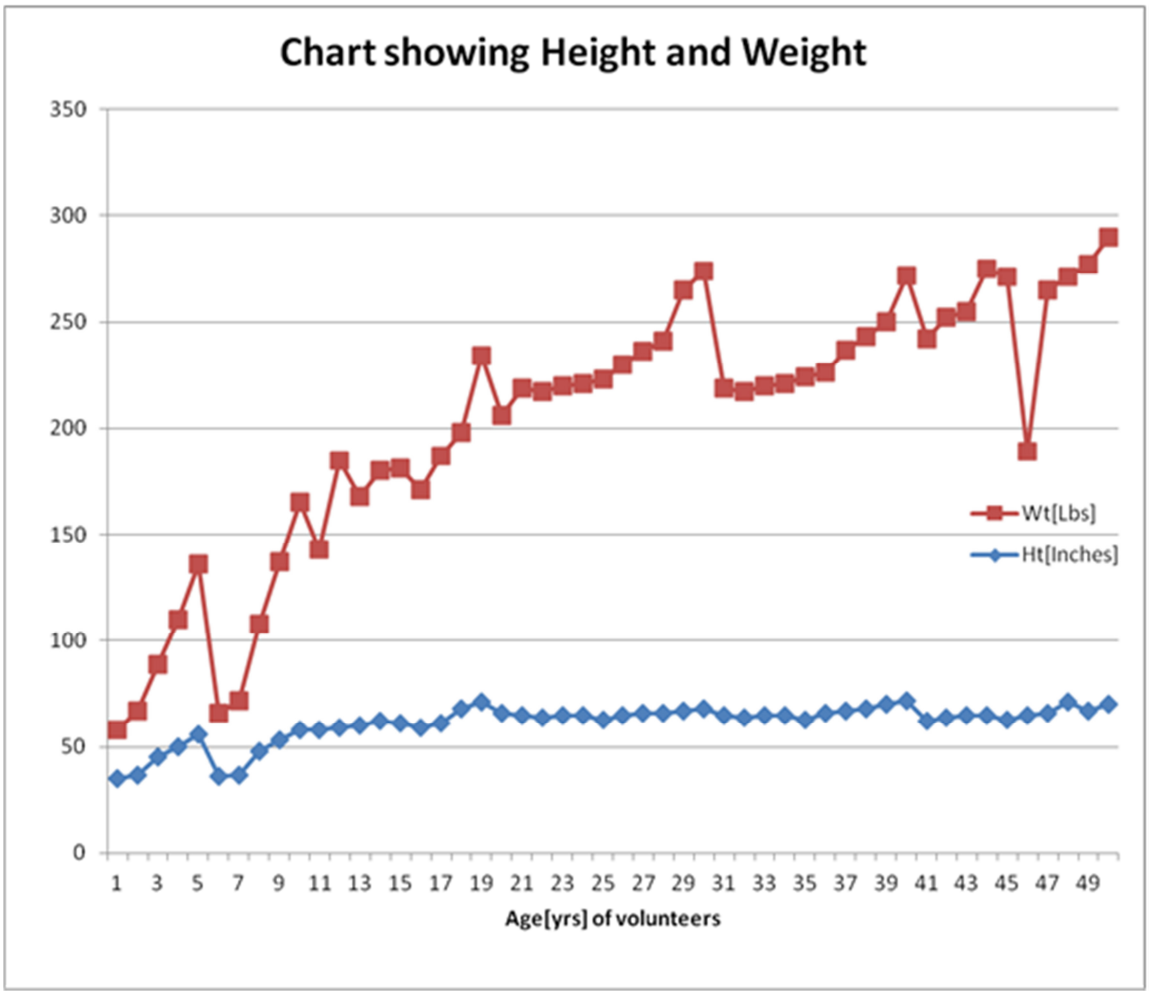
**Fig i**: Bar chart showing means of BP, BMI and Wt.




Blood pressure [BP] and Body Mass Index [BMI] increases as body Weight increases. This increases risks to many diseases.
To stay healthy, keep weight down.

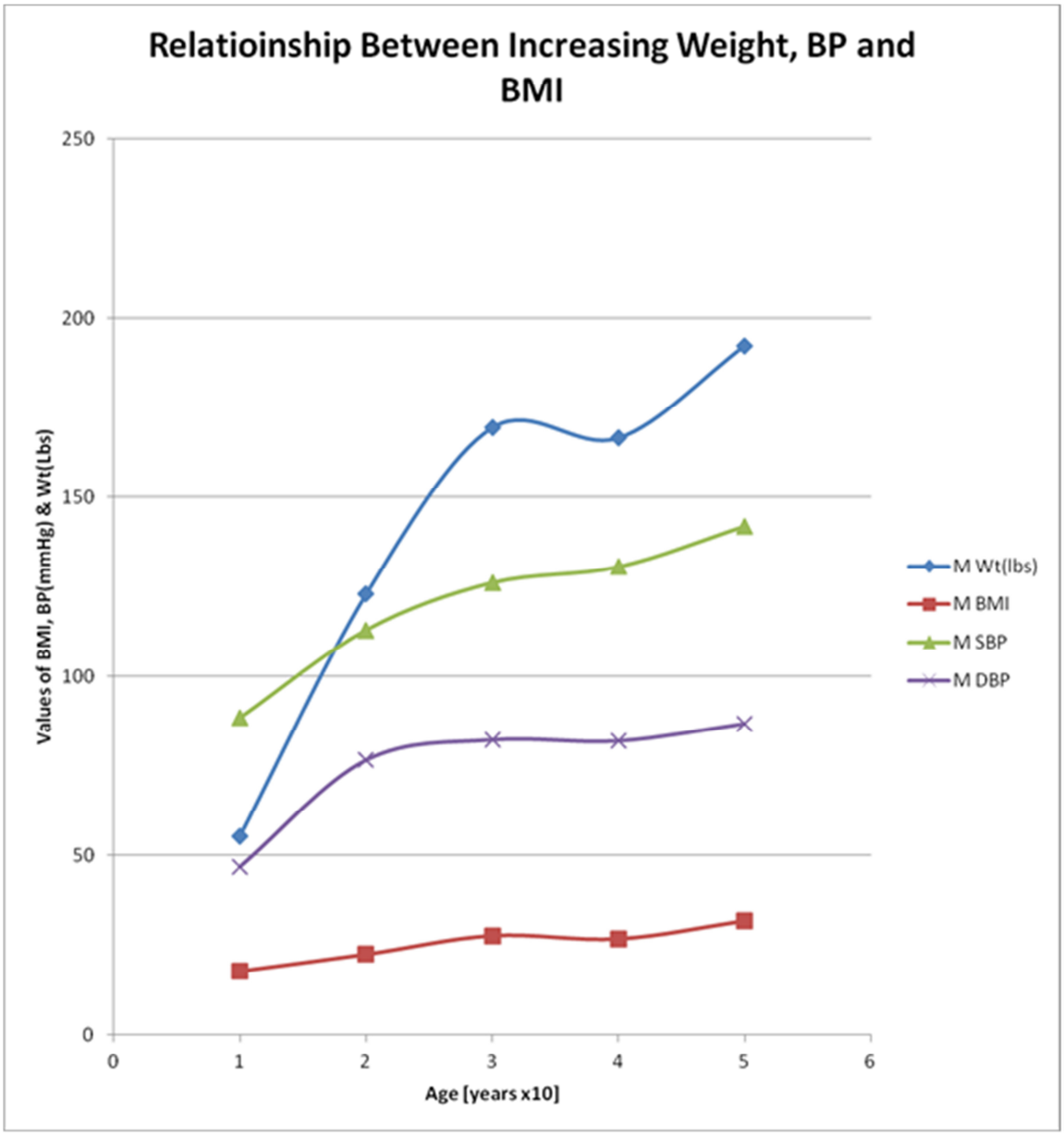
**Fig ii**: Height and Weight




Height and weight increase same way up to about 19years after which Wt tends to continue to rise and Ht remains almost unchanged. Height cannot be changed but weight can be easily gained and lost with much effort.

**Fig iii**: Wt, BMI, SBP & DBP




Only Wt can be easily changed here that will have much effect on others for good or bad.
Reducing Wt or Wt loss will keep BMI down. Thus many people do exercise by walking, biking or visiting gyms.